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ATTACHMENT 2-A

Overall Upgraded Institutional Network Topology

The original Institutional Network will be reconfigured to be a series of independent segments radiating out from the existing Headend. In the upgraded Institutional Network, each segment will be independent from every other segment. Each segment will be composed of the following typical components:

- Headend passive and active devices such as splitters, combiners and amplifiers. This will allow equipment at the Headend to attach to each segment of the system.
- Optical equipment. A set of optical transceivers will run from the Headend to each OTN (Optical Transition Node).
- Coaxial based equipment. Coaxial cable and amplifiers will be used to implement the last links in the cable to the user locations.

The system design calls for thirteen OTN locations. Fiber links will start at the Headend location and connect to each OTN. Coaxial amplifier cascades beyond each OTN will be a maximum of ten devices.

Two segments leaving the Headend will remain coaxial based. These coaxial segments will serve the users near the Headend facility. The maximum cascade on the coaxial segments will be fourteen devices.

In addition, there will be two fiber connecting links:

- An activated fiber connection to the Headend consisting of the following (collectively described in this corrective plan as the City Hall to Headend link):
  1. A fiber connection from the City Hall connected to the Headend at the Institutional Network router; and
  2. A fiber connection from the City Hall Annex to the Headend Ethernet switch.
- A dark fiber connection from the City Hall Annex to the Public Safety Annex.

All obligations of the Company that apply to other portions of the Institutional Network also apply to these connecting links, unless otherwise indicated.

The Institutional Network (including the connecting links other than the dark fiber links) will include all necessary equipment so that frequencies on each segment can be reused on each other segment to provide maximum capacity and flexibility for users.

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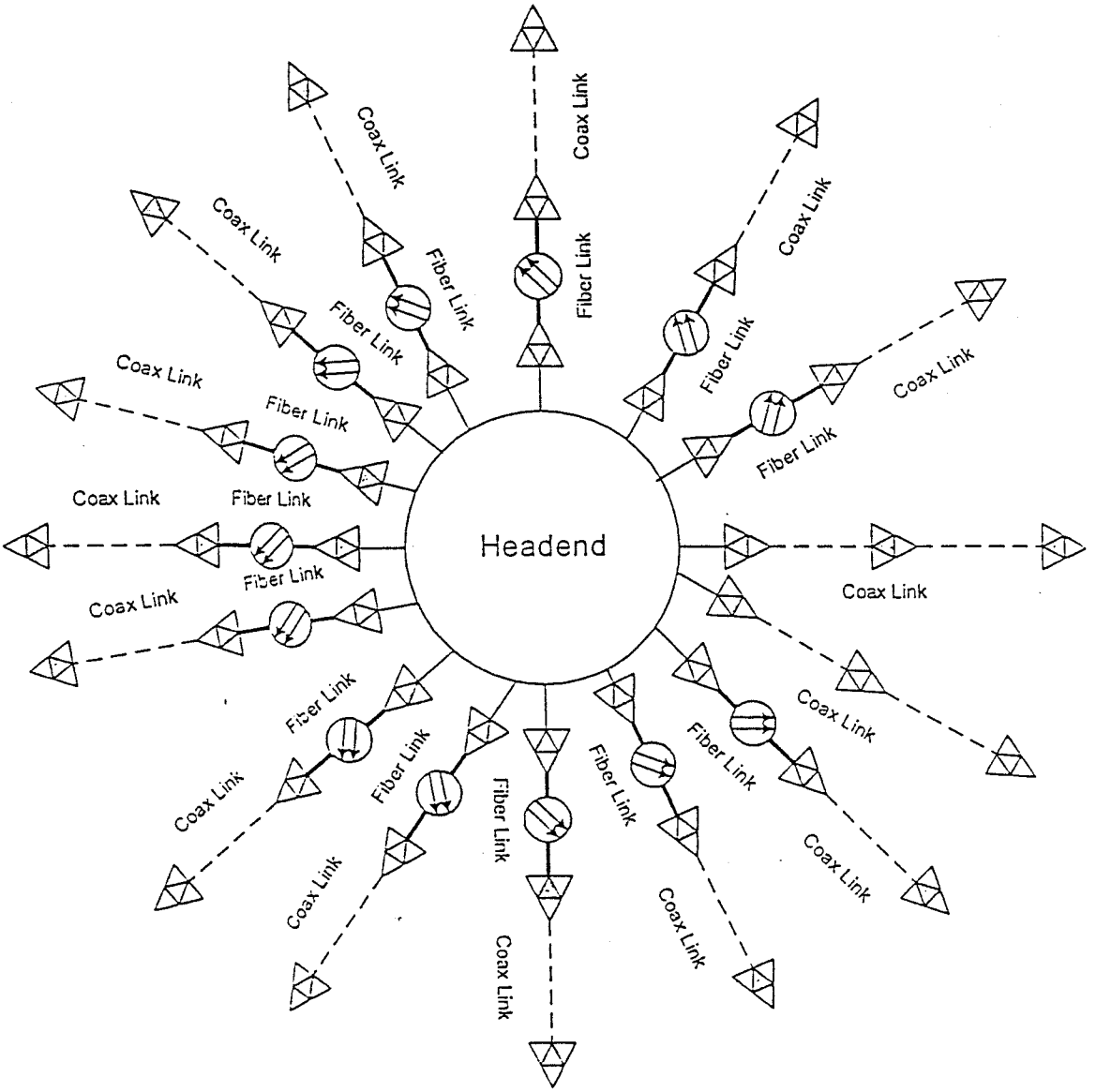
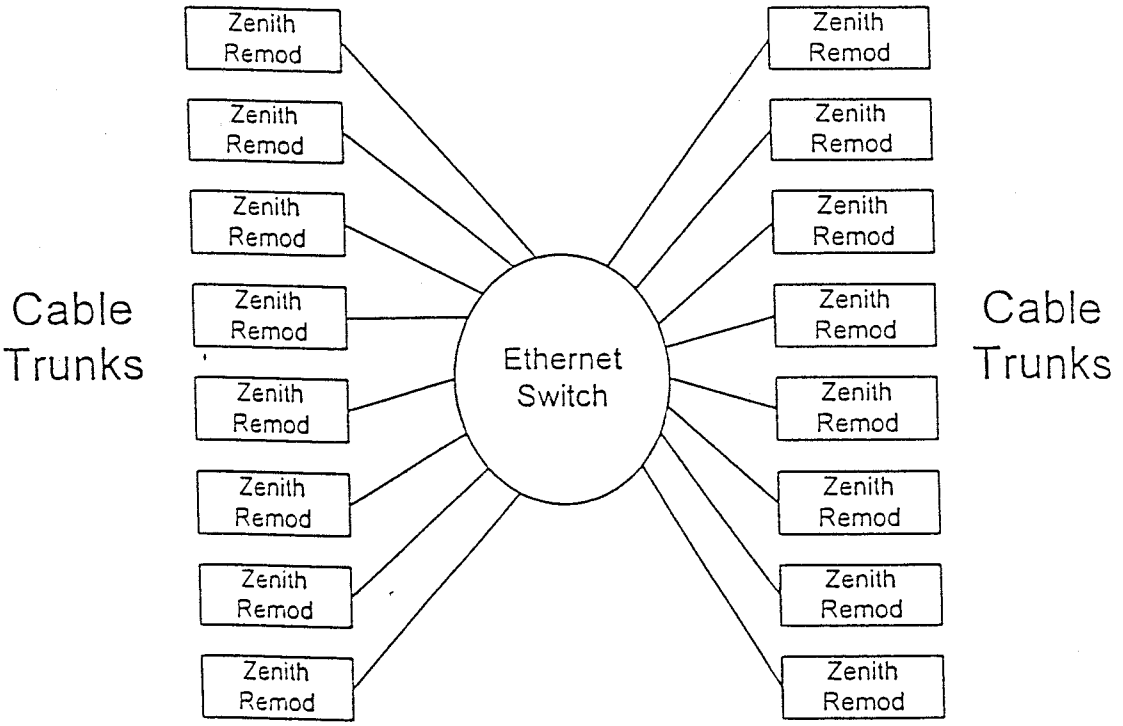
The following drawing illustrates this configuration:



Retrofit for the School Network

The school configuration of the original Institutional Network for data transmission and reception is based upon the Zenith Ethernet modems and is constructed as one large network throughout the City. This topology will be changed in the upgraded Institutional Network to reflect the new configuration of the INET system. Zenith translators and remodulators will be added to each segment of the cable system to support the existing Zenith equipment that is currently in use. An Ethernet switch will be placed at the Headend to link each of the remodulators on each segment to provide the same City wide network structure.

The following illustration shows the proposed logical configuration for this network:



The Ethernet switch located in the Headend will be the link that allows the individual network segments to communicate as a single network.

The following drawing shows a more detailed description of the interconnection of each of the segments in the system to the Ethernet switch:

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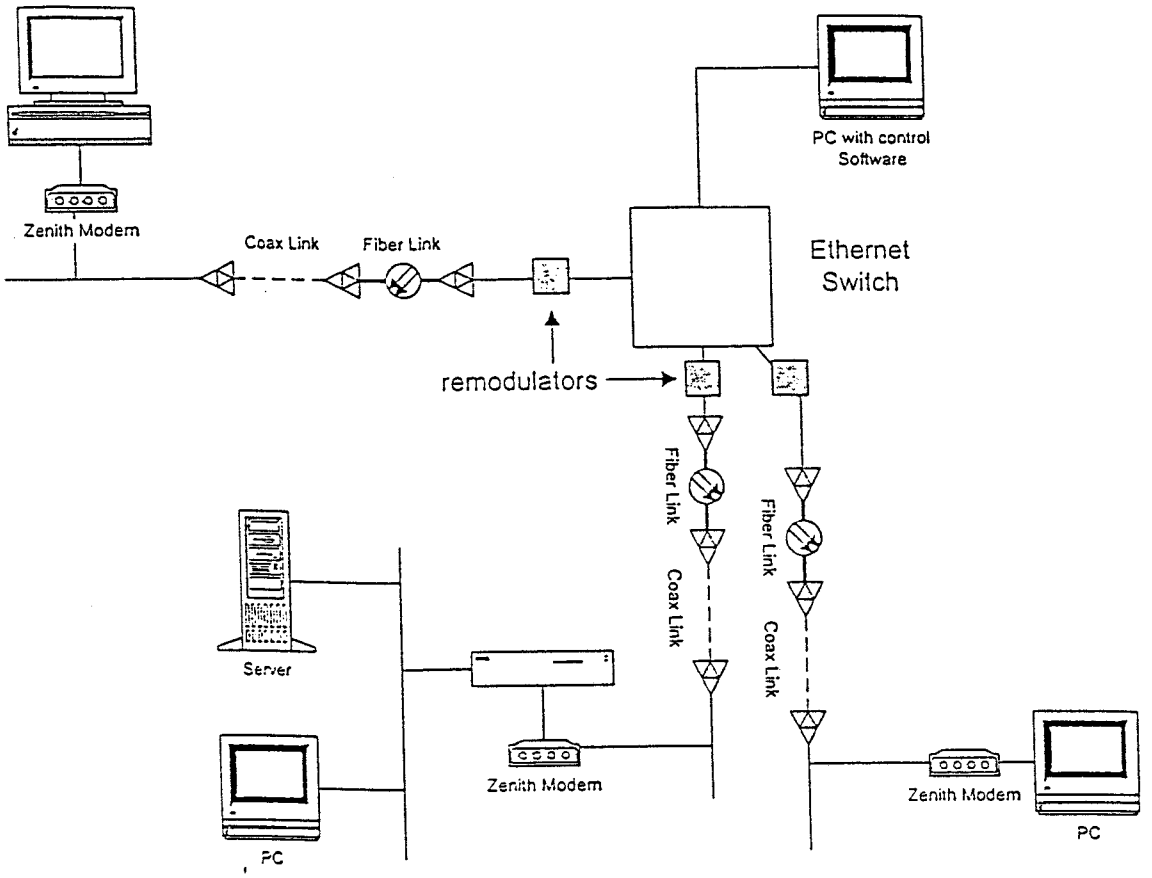


The configuration of each of the end user locations will not need to change during the reconfiguration process. The manner of connection at the Headend will change as the Institutional Network is segmented from one large network into, essentially, fifteen smaller and independent networks.

The PC with control software that the Company will provide will be set up so that it can be programmed remotely by multiple users authorized by the City. The PC will be accessible via a phone connection provided by the Company, either directly or through the Internet, at the City's option.

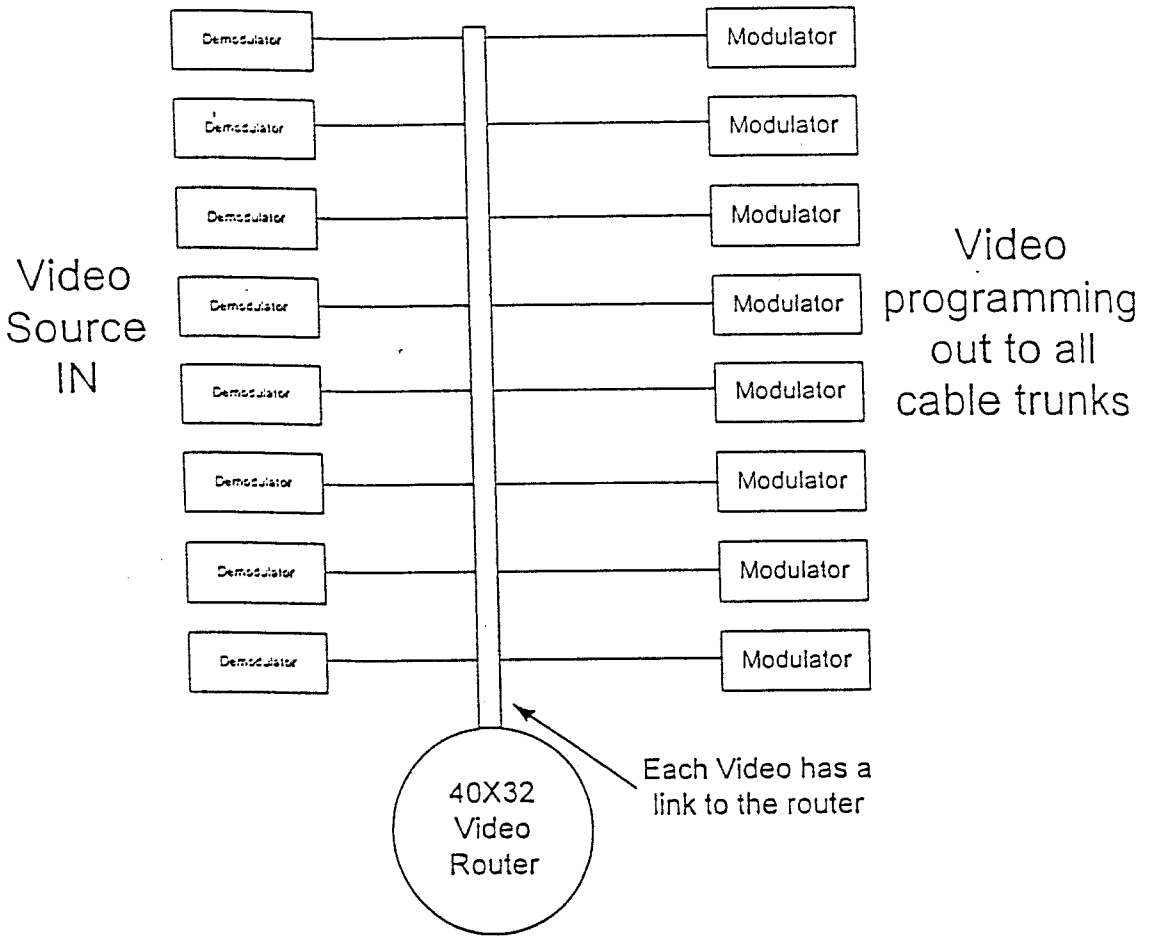
Distance Learning and Video Based Links

Video functions will be enhanced as part of the upgraded Institutional Network in order to allow television to be used more effectively on the system at all sites. Each end user location will be required to have several pieces of equipment:

- A modulator that will allow locally generated programming to be placed on a particular channel for distribution throughout the system.
- A demodulator (television set) will allow the viewing of the programming.

A video and audio router (commonly called a video router) will allow for the dynamic distribution of television programming. It will be integrated with the residential network program routing and switching facilities to permit programming to be routed to and from the Institutional Network. The programmable video router will facilitate the routing of video information between multiple segments in the upgraded Institutional Network should such application be undertaken.

The configuration of the Headend is shown in the following illustration:



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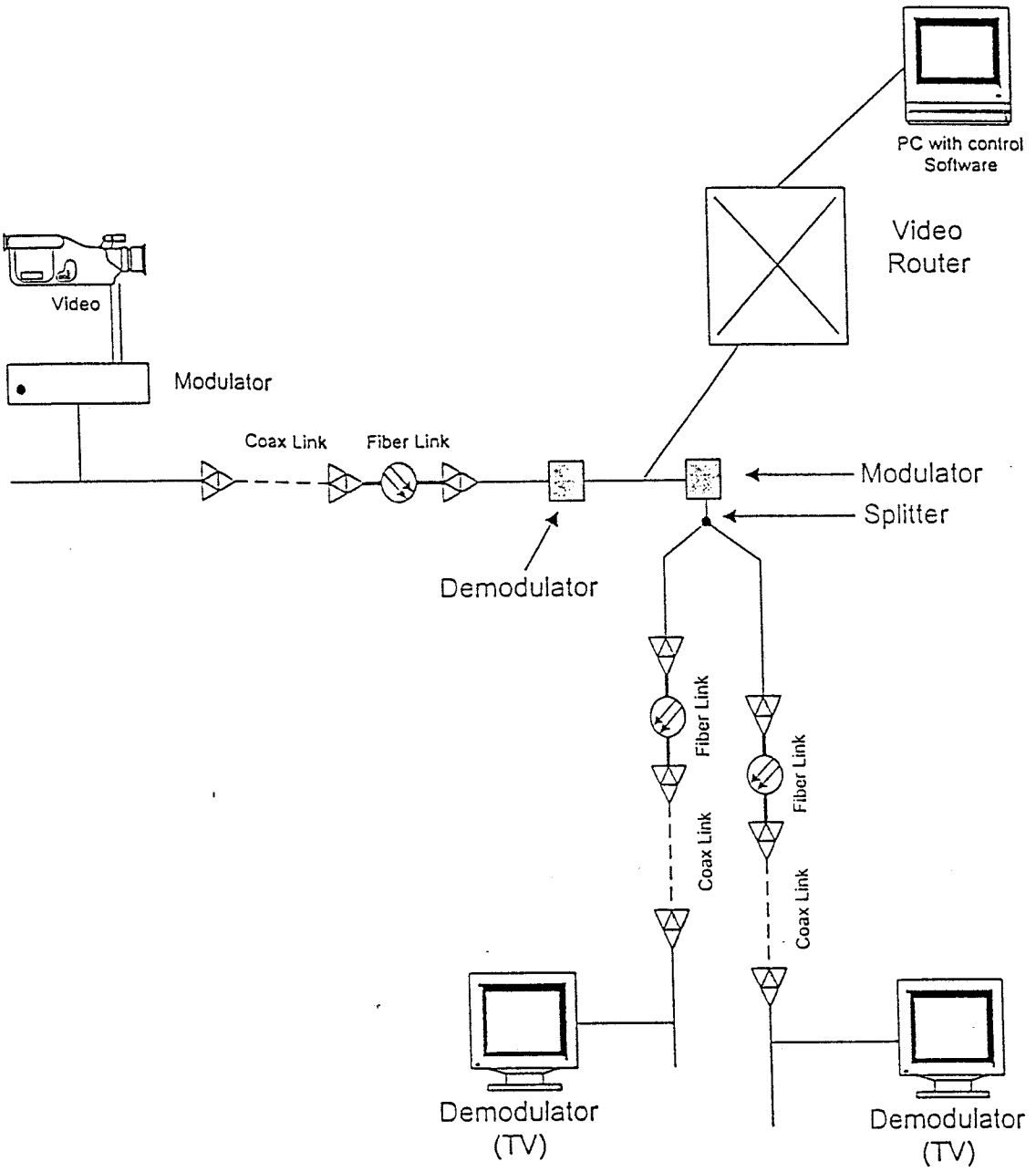
Appropriate modulators and demodulators will be provided to accommodate the utilization of multiple video channels. Standalone demodulators will be used to remove the programming from a particular source and feed it to a video router and a modulator that will place the programming on segments of the Institutional Network. The router can allow the switching of the programming to one or more modulators for distribution through the network should configuration need to be changed in the future. The video router is driven by a PC with scheduling software that can be programmed remotely by multiple users authorized by the City. This software will allow for the advance setup of program times and channels on a one time sessions or repeat basis. The PC will be accessible via a phone connection provided by the Company either directly or through the Internet, at the City's option.

The typical end to end configuration of a video link is shown in the following illustration:



One feed in the system will have unique characteristics. A separate fiber optic cable will be run from City Hall to the Headend location. This will facilitate several channels of City programming originated from City Hall to be distributed throughout the network. A detailed description of this fiber optic link is set forth at page 2-A-9 of this Attachment 2.

City Data Network

The City wide data network will be redesigned as part of the upgraded Institutional Network. The City data network will be based upon available cable modems with speeds ranging from four megabits to as high as thirty megabits per second on each segment of

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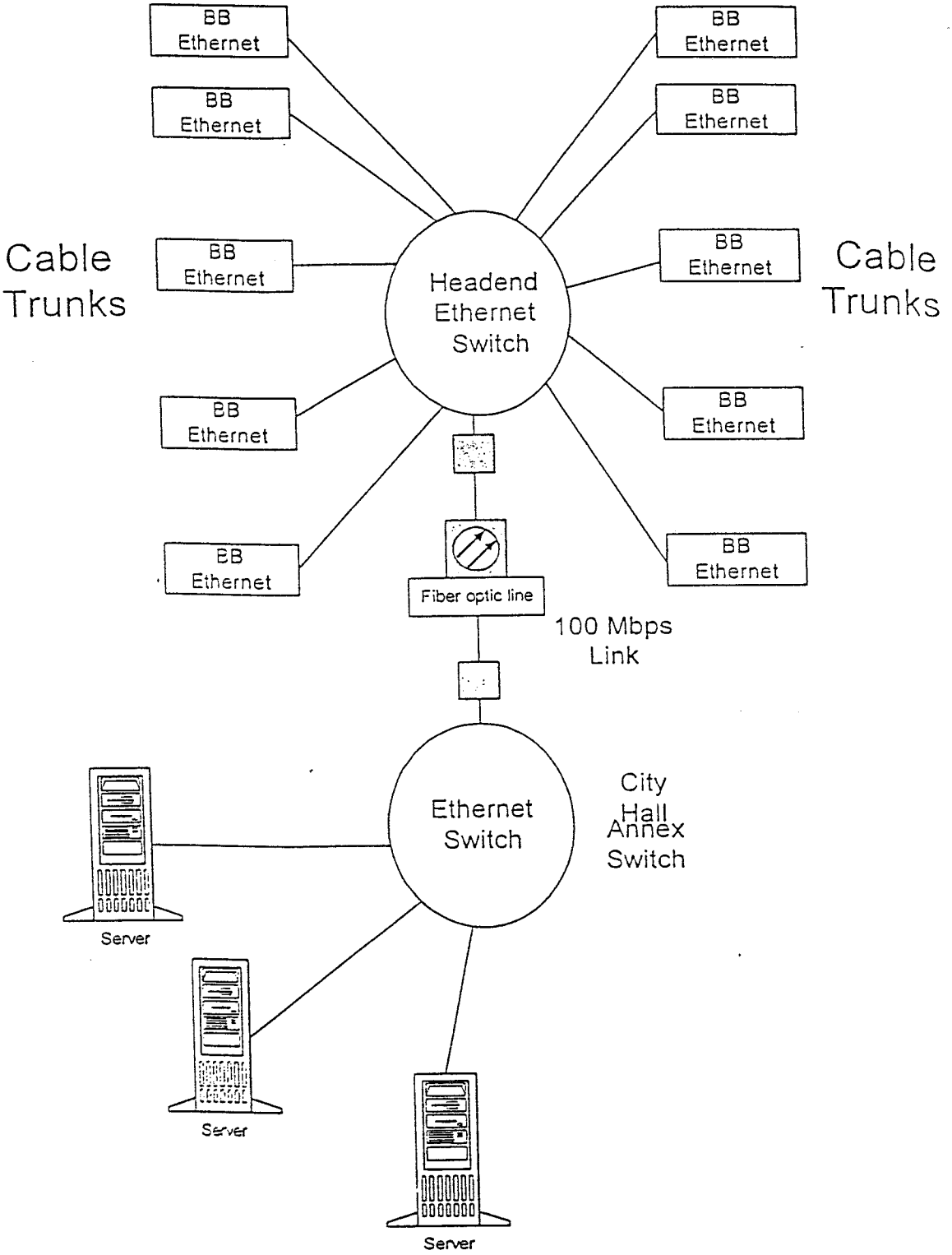
the system and 100 Mbps on the connecting link to the City Hall Annex. An Ethernet switch will be used to combine each of the individual links into one comprehensive system. The diagram on the following page illustrates the topology of this network:



Data from the local segments of the system will be linked at the Headend to an Ethernet switch. This switch will logically link each segment of the system in order to integrate the system. The switch has a one hundred megabit port that will be used to connect to another Ethernet switch located in the City Hall Annex over a fiber optic link. The overall effect of this configuration is:

- The Headend switch integrates this traffic into a single high speed link. High performance servers can be placed on this network in the City Hall Annex to serve the data requirements of many of the user communities.
- The Ethernet switch has the capacity to allow the segmentation of the network into multiple ten megabit Ethernet networks, should the institutions undertake such utilization.
- This equipment will facilitate development of Virtual LANs down to the individual segment of the system, should the institutions undertake such utilization.

Detailed description of City Hall to Headend fiber optic link

A fiber optic cable will be run between City Hall and the Institutional system Headend. Three fibers will be available in this cable for City initially activated to perform the following functions:

1 fiber	analog FM video support
2 fibers	city data network support

Active equipment will be placed at each end of the cable. One link will support the transport of three video channels from City Hall to the Headend router. The other link will connect the 100 Mbps ports on each of the Ethernet switches, one for the City Data Network at the Headend and a corresponding switch to be placed at City Hall Annex.

The following drawing illustrates this configuration:

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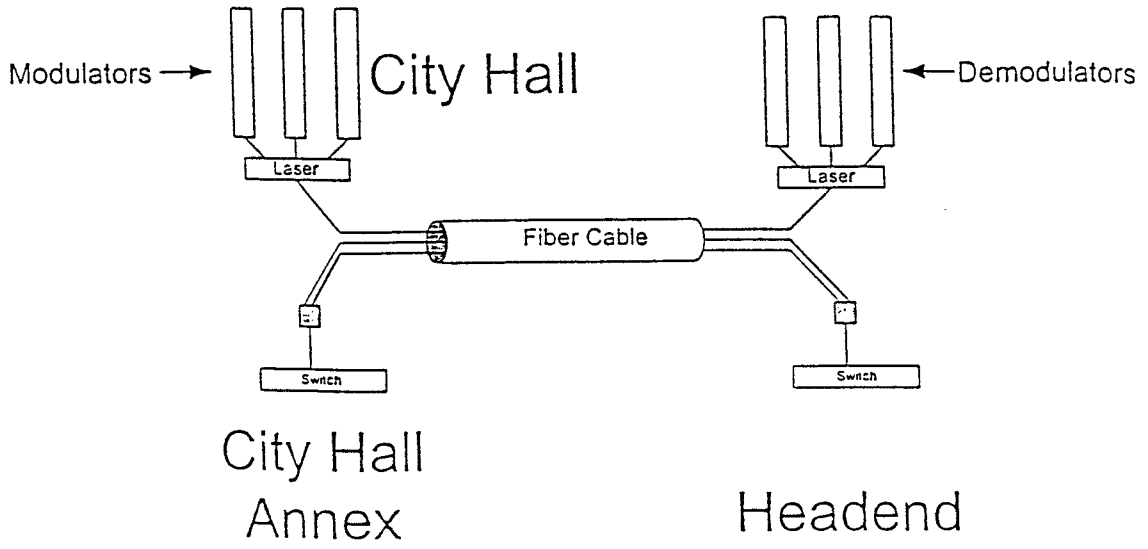
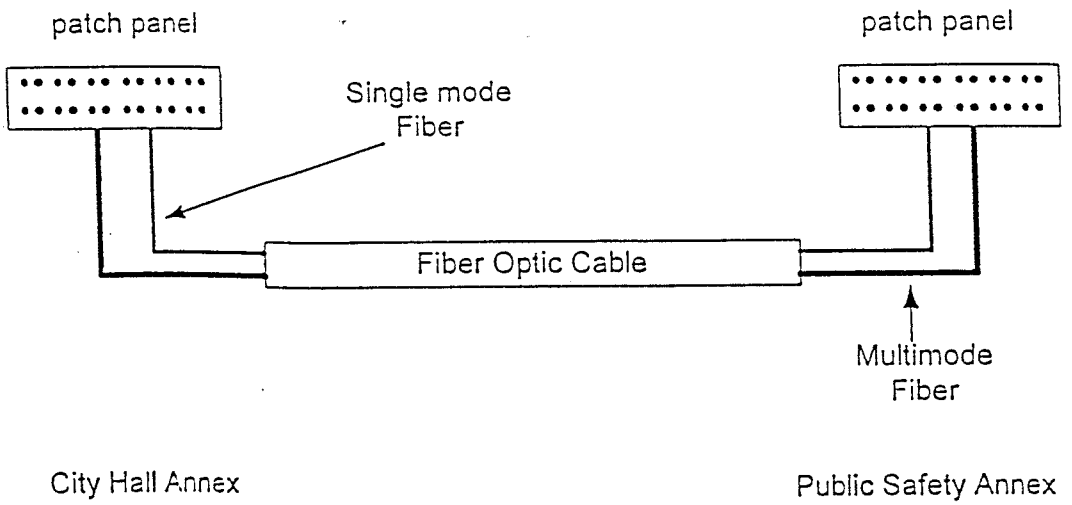


Detailed description of City Hall Annex to Public Safety Annex fiber optic link

Franchisee will install 12 Multimode and 12 single mode fibers from a point disignated by the City in the City Hall Annex to a point designated by the City in the Public Safety Annex. At each fiber termination point, the Company will install termination block hardware including standard connectors to be designated by the City, appropriately labeled, so that the City can connect the fiber to its network.

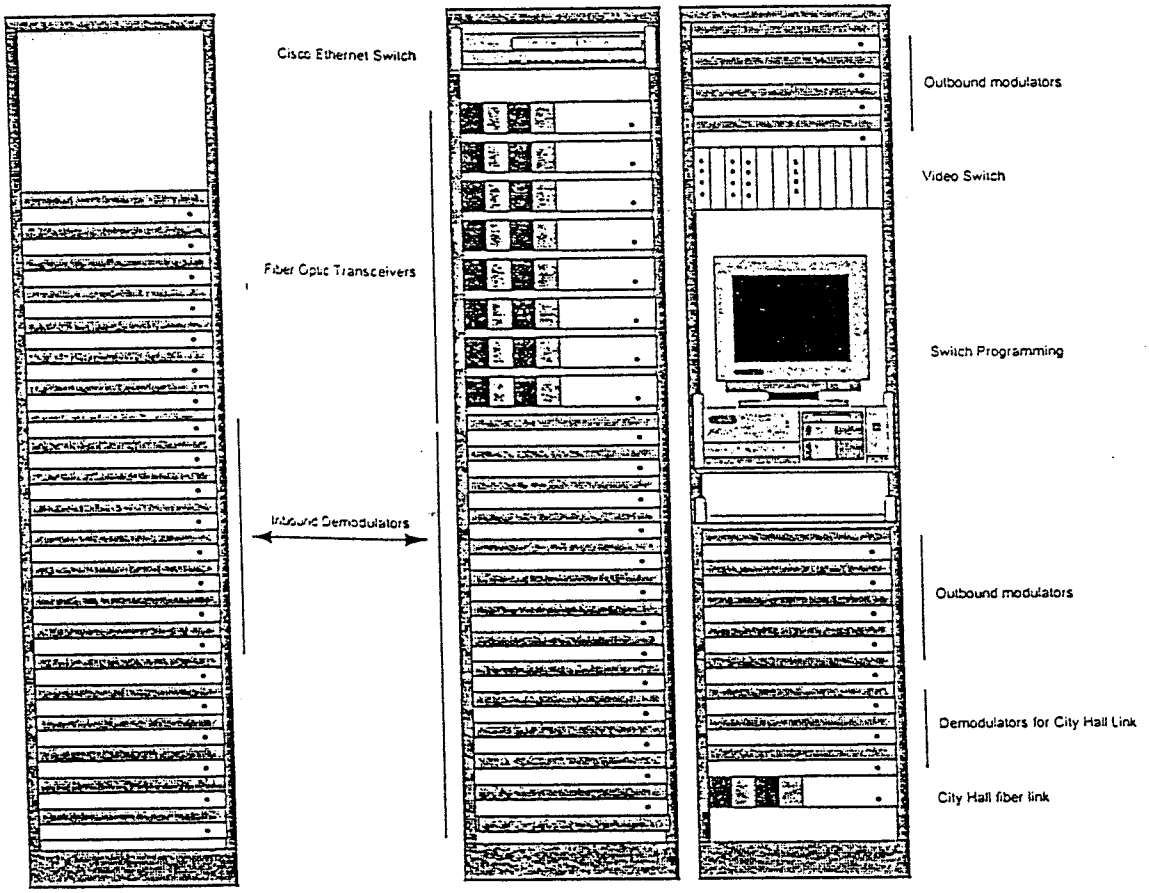
The following drawing illustrates this configuration:



Diagrams of the Headend Rack

Following is an example of the layout for INET racks in the Headend. The rack contain the following equipment:

1. Ethernet switch
2. Video router
3. Management PC
4. Outbound (forward channels) modulators
5. Inbound (reverse channels) demodulators
6. Fiber optic transceivers for the City Hall link
7. Demodulators for the City Hall link
8. Fiber optic transceivers for each INET segment
9. Other equipment associated with the use or operation of the Institutional Network



Notwithstanding the above example, all Institutional Network Headend equipment will be assembled in a manner that is appropriate and accessible for making adjustments. The actual Institutional Network Headend equipment layout will be subject to City approval upon completion and the City will be consulted on any future changes.

If the City wishes to enhance the performance of the Institutional Network (by, for example, activating an additional data channel or equipment that permits it to perform additional functions on connecting links), it may purchase the equipment to do so, and the Company will install it and maintain it at the Headend.

Video and Audio Monitoring

The existing test bay used to support the subscriber network will be used to monitor the video on the Institutional Network for quality and troubleshooting.

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ATTACHMENT 2-C

EQUIPMENT LIST

Location	Parts & Labor	Part Number	Qty
I-NET			
Transport Plant	Optical RC	Phillips 817-1FRX	13
	Optical TXC	Phillips 2102A-10-TX	13
	Status Monitoring-power supply	Cheetah CMM3	71
	End Of Line Monitoring	Cheetah LC1000	45
	Power supply	ALT200849	25
	Thermal AGCs	Phillips	100
	0.750" coax	Commscope P3-750	1600
	Coax Mgmt Hardware	generic	1
	Fiber Mgmt Hardware	generic	1
	Fiber Cable per mile	Siecor 18 fiber SM	1
	Splicing	Generic fiber splice process	208
	Equipment Racks	Scientific Atlanta RA-701924	4
Headend Equipment			
	Optical RC	Phillips RDRX	13
	Optical TXC	Phillips 710-TX	13
	Misc. Amps/filters		1
	Status Monitoring	Cheetah HE-1000	1
	Status Monitoring	Cheetah HEC- 3	1
	Status Monitoring	Network Monitoring Software	1
	Status Monitoring	Cheetah RPS	1
	Demodulators FM	Synchronous VFMR-5000-12	30
	Modulators AM	SA 6350	9
	Video/audio Router, 40 X 32	Tahoe 40 X 32	1
	Crestron management software		1
	PC	Generic, Pentium with Win95	1
	Printer	HP 400L DeskJet	1
Data Equipment to retrofit school links	Zenith Translator	Zenith LANNT-550-W-CE	15
	Zenith Remodulator	Zenith LANREMOD-4M-44	15
	Ethernet Switch	Cisco 2926	1
	HP Openview		1
	CiscoWorks management Software	CWPC-2.1-WIN-SMO	1
	PC	Generic, Pentium with Win95	1

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City data channel	LanCity provisioning server LCn	LanCity LCn	1
	LanCity Transmaster LCt	LanCity LCt	8
	LanCity Headend node	LanCity LCh	16
	LanCity miscellaneous		1
	Media Converters	Nbase 100Mbps drivers	1
	Ethernet Switch	Cisco 2926	1
Institutional TV			
	Modulators FM	Synchronous VFMT-5000-12	30
Headend to City Hall Link			
Video Equipment	Demodulators FM	Synchronous VFMR-5000-12	3
	Modulators FM	Synchronous VFMT-5000-12	3
Link Materials	Optical RX	Phillips 817-1FRX	1
	Optical TX	Phillips 710-TX	1
	Fiber Cable	Seicor	4.5
	Fiber Mgmt Hardware	generic	4.5
	Ethernet Switch	Cisco 2926	1
	Media Converters	Nbase 100Mbps drivers	1
City Hall to Public Safety Link			
	Fiber Cable	Seicor burial 24 fiber SM/MM	1
	Fiber Mgmt Hardware	generic	1

Although it is contemplated that the equipment listed herein will be used, company reserves the right to substitute alternative equivalent equipment as necessary. Such equipment substitutions will be subject to City approval, which will not be unreasonably withheld.

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ATTACHMENT 2D

CHANNELIZATION PLAN

Forward Channel	Video Carrier MHz	Function	Channel Limits MHz
L (25)	229.25	agc pilot	228-234
M(26)	235.25	Leakage	234-240
N(27)	241.25	sch data 1	240-246
O(28)	247.25	sch data 2	246-252
P(29)	253.25	Sch data 3	252-258
Q(30)	259.25	Institution	258-264
R(31)	265.25	Revisors	264-270
S(32)	271.25	Institution	270-276
T(33)	277.25	Institution	276-282
U(34)	283.25	Institution	282-288
V(35)	289.25	Institution	288-294
W(36)	295.25	Cherokee	294-300
AA(37)	301.25	Institution	300-306
BB(38)	307.25	Institution	306-312
CC(39)	313.25	Institution	312-318
DD(40)	319.25	Institution	318-324
EE(41)	325.25	Institution	324-330
FF(42)	331.25	City data 1	330-336
GG(43)	337.25	City data 2	336-342
HH(44)	343.25	agc pilot	342-348
II(45)	349.25	City data 3	348-354
JJ(46)	355.25	City data 4	354-360
KK(47)	361.25	Institution	360-368
LL(48)	367.25	Institution	368-372
MM(49)	373.25	Institution	372-378
NN(50)	379.25	Institution	378-384
OO(51)	385.25	Institution tv 1	384-390
PP(52)	391.25	Institution tv 2	390-396
QQ(53)	397.25	Institution tv 3	396-402
RR(54)	403.25	ed tv 1	402-408
SS(55)	409.25	ed tv 2	408-414
TT(56)	415.25	ed tv 3	414-420
UU(57)	421.25	ed tv 4	420-426
VV(58)	427.25	ed tv 5	426-432
WW(59)	433.25	ed tv 6	432-438
XX(60)	439.25	government tv	438-444
YY(61)	445.25	government tv	444-450

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Return Channel	Frequency	Function	Channel Limits
T7	7	pilot & cheetah	5.75-11.75
T8	13	Institution	11.75-17.75
T9	19	City data 1	17.75-23.75
T10	25	City data 2	23.75-29.75
T11	31	City data 3	29.75-35.75
T12	37	City data 4	35.75-41.75
T13	43	sch data 2	41.75-47.75
open	49	available	47.75-54
2	55.25	sch data 4	54-60
3	61.25	sch data 1	60-66
4	67.25	Cherokee	66-72
open	NA	open	72-76
5	77.25	Revisors	76-82
6	83.25	sch data 3	82-88
FM	88-90	Institution	88-90
FM(95)	90-96	Institution	90-96
FM(96)	96-102	Institution	96-102
FM(97)	102-108	Institution	102-108
A-2(98)	109.25	fm tv 1	108-114
A-1(99)	115.25	fm tv 1	114-120
A(14)	121.25	fm tv 2	120-128
B(15)	127.25	fm tv 2	128-132
C(16)	133.25	Institution	132-138
D(17)	139.25	Institution	138-144
E(18)	145.25	govenment tv	144-150
F(19)	151.25	pilot	150-156
G(20)	157.25	government tv	156-162
H(21)	163.25	Institution	162-168
I(22)	169.25	Institution	168-174

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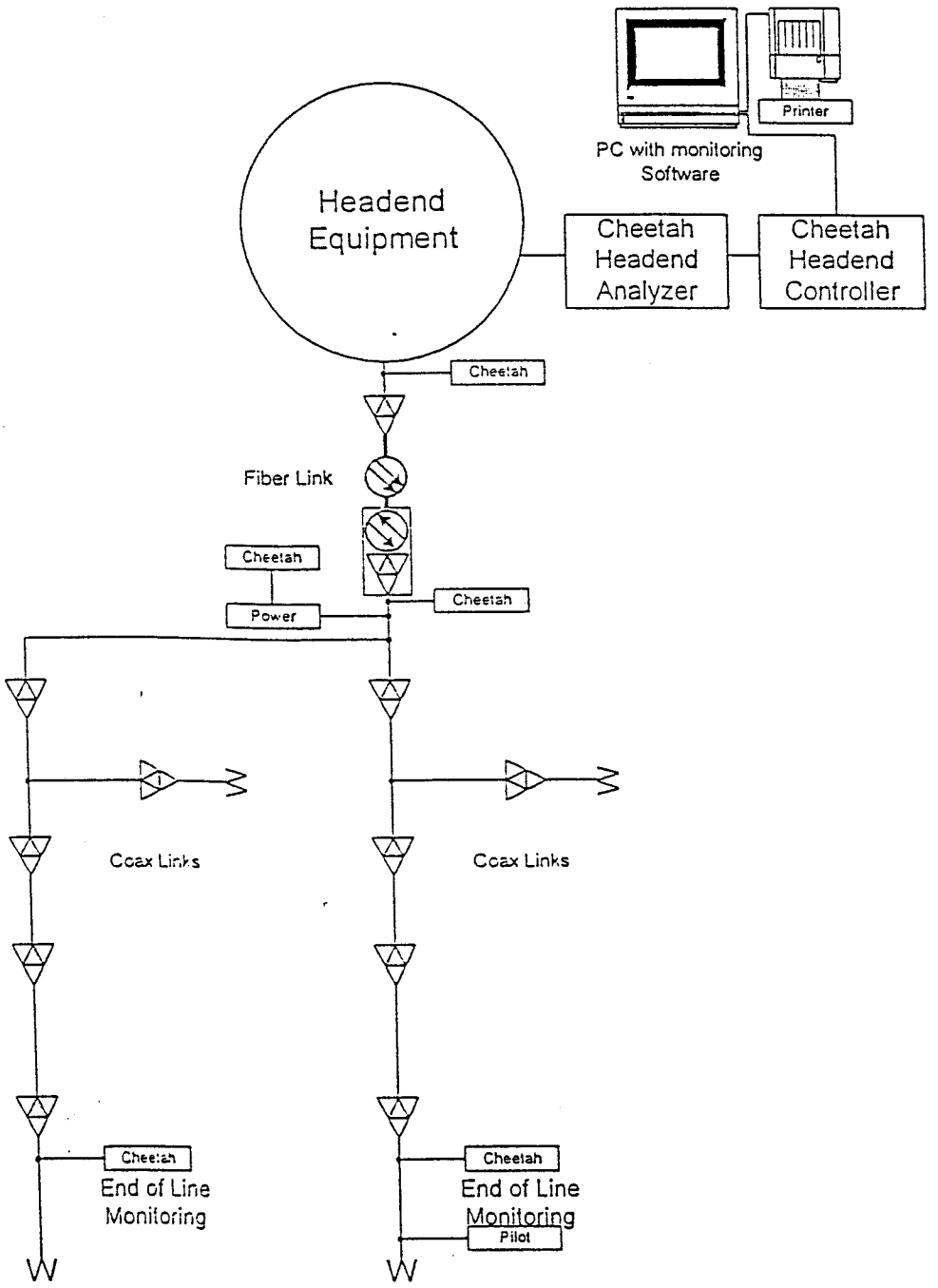
ATTACHMENT 2-E
STATUS MONITORING LOCATION EXAMPLE



Status monitoring equipment will be installed at the end of the longest cascade (or, if appropriate, based on consultation with the City, the user location furthest from the Headend in any given "Segment" or run) from the Headend for each (29) of the primary trunk segments off each OTN. In addition, each of the OTN's and Power Supply locations shall be monitored. This approach results in 13 monitors at OTN locations, 29

monitors on coaxial segments off the OTN locations and 3 monitors on coaxial only segments plus 71 power supply locations.

The exact location of the monitors shall be jointly planned by the Company and City to provide the greatest benefit to the City user community.

ATTACHMENT 2-F
MAINTENANCE PERFORMANCE
STANDARDS AND TESTING PROGRAM

A. MAINTENANCE

Additional Maintenance Staffing

Company will designate two and one-half in-house or contractor staff equivalency positions exclusively for the purpose of assuring high-quality preventive and ongoing maintenance of the upgraded Institutional Network. These staff positions will be in addition to the approximately 14 technical staff who will be available and have responsibilities from time to time for various aspects of upgraded Institutional Network performance

On-Call Support

Company will provide technical support 24 hours a day seven days per week. This will be accomplished with "on-call" technicians who are scheduled to carry a pager and will respond to all pages within 30 minutes. This service will be directly available to all Upgraded Institutional Network users. Network or data service support must be processed by user through user's pre-designated "network manager" or point person before the company's on-call technician is paged.

Company is responsible for ensuring that all parts of the Institutional Network from the applicable Demarcation Point function properly and reliable, so that the network is fully useable from each location. The Company is also responsible for maintaining and replacing as necessary all equipment that it provides or has provided at end user premises beyond the Demarcation Point, to this same end.

User's Group/Quarterly Meetings

Company will reach out to each category of Institutional Network user and establish "User's Groups" to be invited to meetings which will convene at least once each calendar quarter for the purpose of sharing ideas, suggesting improvements, voicing concerns, and receiving training on system changes or new equipment. These User's Group meetings and relationships will assist Company in identifying maintenance issues early and should also enhance the user's understanding of the Upgraded Institutional Network capabilities, and thereby enhance or increase utilization.

Service Call Processing and Tracking

Company will set up mechanisms and procedures for all I-Net users to quickly and easily report system trouble. These trouble or service calls will then be documented, processed, and completed in the same manner as subscriber calls. With this documentation will come monthly I-Net service call reports which will include a breakdown of reasons and resolution as well as call handling efficiency.

Notwithstanding the staffing, testing and equipment and response requirements set forth herein, the Company will provide whatever in-house and/or contractor staff, spare and equipment backup, test and maintenance equipment and whatever additional steps are necessary to ensure that network performs reliably up to the applicable standards, including reliability standards and:

- Company will provide Institutional Network users the highest level of service, reliability, repair and maintenance that is made available to any commercial or residential user of the cable system.
- Institutional Network paths carrying critical circuits (as identified by the City) shall receive the highest priority in the Franchisee's repair program.

Reliability

The Institutional Network reliability for all channels and transmission links between any two Demarcation Points, plus equipment for which the Company is responsible at the User premises shall meet or exceed 99.9%. This shall be taken to mean that the total cumulative outage time at any activated Institutional Network User site shall not exceed 430 minutes over the period of one year. An outage is defined as any unscheduled event that prevents the transmission of data, video or sound on any channels at the speeds or at the standards set forth herein because of a failure of some portion of the path or the equipment that the Company is responsible to maintain.

A failure caused by an electrical outage at the User site which prevents the User from using the Institutional Network or power for Institutional Network components shall not be considered a failure. Outages of any kind caused by acts of God shall not be covered under the definition of a failure. Normal system outages that have been scheduled in advance by the Company with a designated representative of the City shall not be covered under the definition of a failure.

At any time that any channel on the Institutional Network is known to fall below the technical standards set forth herein, actions shall be taken to restore the operation of the network to the standards within 72 hours.

Network Frequency Response Sweep

All active portions of the I-Net will be swept for frequency response in forward (outbound) and return (inbound) bands every 12 months, or upon request of the City, more frequently as may be indicated for specific problem solving, but in any event no more than one additional network frequency response sweep per year.

B. STANDARDS AND TESTING

System Leakage Surveillance

The Company proposes to measure leakage using a generator placed at the Headend location using a frequency of 235.2625 MHz transmitting with a level to match that of the video carriers at the point of insertion into the system. The Company subscribes to the NCTA Recommended Practices section I.G. pages 1 through 10 as it is a thorough and well understood testing process. The procedure will provide a cableplant that will be usable in all channels by identifying points of egress that could also be points of ingress. The Signal Leakage Standard shall be 10 microvolts/meter between the Headend and Demarcation point for the frequencies in the forward and reverse directions.

These tests will be done in accordance with the NCTA Recommended Practices for Measurement on a Cable Television System for Signal Leakage Performance (attached), as referenced in the FCC CFR section 47, Subpart K, part 76.601, 76.609(h),(1,2,3,4,5).

Proof of Performance Twice Annually

Proof of performance testing will be conducted on the I -Net two times per year equivalent to that specified by the FCC for subscriber networks. A minimum of ten test point locations will be established where feasible throughout the system which are representative of worst-case performance. A minimum amount of fifteen channels on the forward, and twelve channels on the return shall be tested at each test point location. The Technical Standards and Performance Testing listed below are specifically for Continental Cablevision, St. Paul, I-Net System. Some of the testing procedures have been modified to meet the specific needs of a High Split Return System. Company will comply with the following minimum standards and tests:

- The Combined Carrier to Noise Ratio Standard for this system will be 47 dB between the Headend and any Demarcation point for the worst-case performance of the forward portion combined with the reverse portion of the Institutional Network. This includes the Fiber Backbone and the Coaxial Distribution System.

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Testing will be done at the Demarcation point after the last active component on the longest cascade, and at an RF test point in the Head End, then standard logarithmic calculations will be used to combine the two test points. These tests will be done in accordance with the NCTA Recommended Practices for Measurement on a Cable Television System for Carrier to Noise Ratios (attached), as referenced in the FCC CFR section 47, Subpart K, part 76.601, 76.609(e).

- The Combined Composite Triple Beat Standard for this system will be 55 dB between the Headend and any Demarcation point for the worst-case performance of the forward portion combined with the reverse portion of the Institutional Network. This includes the Fiber Backbone and the Coaxial Distribution System.

  Testing will be done at the Demarcation point after the last active on the longest cascade, and at an PF test point in the Head End. Then, a standard logarithmic calculation will be used to combine the two test points. These test will be done in accordance with the NCTA Recommended Practices for Measurement on a Cable Television System for Composite Triple Beat (attached), as referenced in the FCC CFR section 47, Subpart K, part 76.601, 76.609(f).

- The Combined Composite Second Order Standard for this system will be 58 dB between the Headend and any Demarcation point for the worst-case performance of the forward portion combined with the reverse portion of the Institutional Network. This includes the Fiber Backbone and the Coaxial Distribution System.

  Testing will be done at the Demarcation point after the last active on the longest cascade, and at an RF test point in the Head End. Then, a standard logarithmic calculations will be used to combine the two test points. This test will be done in accordance with the NCTA Recommended Practices for Measurement on a Cable Television System for Composite Second Order (attached), as referenced in the FCC CFR section 47, Subpart K, part 76.601, 76.609(f).

- The Combined Cross Modulation standard for this system shall be 54 dB between the Headend and any Demarcation point for the worst-case performance of the forward portion combined with the reverse portion of the Institutional Network. This includes the Fiber Backbone and the Coaxial Distribution System.

  Testing will be done at the Demarcation point after the last active on the longest cascade, and at an RF test point in the Head End. Then, a standard logarithmic calculations will be used to combine the two test points. This test will be done in accordance with the NCTA Recommended Practices for Measurement on a Cable Television System for Cross Modulation (attached), as referenced in the FCC CFR section 47, Subpart K, part 76.601, 76.609(f).

- In Channel Response The amplitude characteristic shall be within a range of +/- 2dB from 0 to 6.0 MHz above the lower boundary frequency using appropriate equipment for measurement of the I-Net channel, referenced to the average of the highest and the lowest amplitudes within the frequency boundaries.

  Testing will be done at the Demarcation point after the last active component on the longest cascade, and at an RF test point in the Head End. These tests will be done in accordance with the NCTA Recommended Practices for Measurement on a Cable Television System for In Channel Response (attached), as referenced in the FCC CFR section 47, Subpart K, part 76.601, 76.609),(d)(1,2).

- Peak to valley variations. The Company proposes conformance to the NCTA Recommended Practices, I.E. page 4 that states a figure calculated with the formula $\frac{N}{10}+2$ for the coaxial segments of the cableplant. This yields a figure of 3 dB for a ten amplifier cascade and 3.5 dB for a fourteen amplifier cascade where N represents the number of amplifiers in the cascade.

In addition to the foregoing, as part of this testing and the annual origination point testing, Company will demonstrate that the Connecting Link from the City Hall Annex to the Headend satisfies the standards specified in Section C, "Acceptance Testing".

Additional Power Supply Inspections

All I-Net power supplies will be inspected at least twice per year, which will include the following checks and tests:

- Full load transfer and runtime test
- Battery condition and maintenance check, including replacement if required
- Status monitoring functional test
- Check the logic module

Monthly End-of-Line Checking

The further ensure that the I-Net is performing satisfactorily, monthly checks will be performed at a minimum of ten locations that are representative of worst-case performance. These checks will, include the following:

- RF level measurements at all pilot carriers and all CW carriers or measurable carriers (e.g., analog video and audio, unmodulated data, etc.)
- Leakage test
- Frequency Response on forward and return
- Subjective picture quality tests, if applicable

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Daily Checks

- Review status monitoring system parameters and levels
- Log the parameter values

Annual Origination Point Testing

An annual check of each data and video origination point will be scheduled with I-Net users. The test may be waived or rescheduled at the discretion of users. These checks will include the following:

- Visual signal level at the institutional site shall be in accordance with the NCTA. Recommended Practices for Measurement on a Cable Television System for Visual signal level, as stated in the FCC CFR section 47, Subpart K, Part 76.601, 76.605 (a) (3).

- RF signal level variation at the institutional site shall be in accordance with the NCTA Recommended Practices for Measurement on a Cable Television System for Visual signal level (attached), as referenced in the FCC CFR section 47, Subpart K, Part 76.601, 76.605 (a) (4).

- Aural frequency separation and deviation level at the institutional site shall be in accordance with the NCTA Recommended Practices for Measurement on a Cable Television System (attached) as referenced in the FCC CFR section 47, Subpart K, part 76.601, 76.605 (a) (2),(5).

- Data RF levels shall be maintained in accordance with the NCTA Recommended Practices for Measurement on a Cable Television System for Visual signal level (attached).

- Annual Interference Test. Using the Hewlett Packard 8591C or the Tektronix 2715 or similar test equipment and a reference carrier, the Company proposes 40 dB for the frequencies between 50 MHz and 450 MHz. The company proposes 30 dB for the frequencies between 11 MHz and 50 MHz. The Company proposes best effort for the frequencies of 5 MHz through 11 MHz and the carriers in the 27 MHz areas. The Company reserves the right not to conform to such specifications where known continuous wave broadcast services exist. Existing areas such as the CB band, international AM, and nearby police or fire service transmitters are examples.

Documentation

All tests and checks will be documented and, upon request, filed with the City. At the City's request, all testing processes may be conducted under the observation of a representative from the City.

C. ACCEPTANCE TESTING

The acceptance testing to determine completion of construction and compliance with the performance standards set forth above will be composed of four parts:

1. Physical configuration
2. RF testing
3. Baseband video testing at the Headend
4. End to end testing

Each of these areas will lead to the initial operation testing of the network, develop the turnover documentation and form a reference for future troubleshooting.

Physical Configuration

The physical configuration of the RF network will be inspected to monitor conformance Attachments 2-A and 2-B. Inspections of the cable runs and components will be made during the construction process to maintain the integrity of the design and Company shall keep records thereof. Should a change be required, written documentation shall be developed that outlines the reason for the change.

Equipment will be tested for initial operability upon receipt from the manufacturer and documentation of such testing shall be developed.

RF Testing

The RF testing of the Institutional Network will be performed in phases throughout the construction period in order to minimize disruption and consists of four steps:

1. Perform the rough balance and sweep. This will perform the initial alignment of all amplifiers, such as level and slope, and identify any problems with the cableplant.
2. Perform distortion testing at the Headend, each OTN and at each end of line.
3. Test the cableplant for leakage.
4. Assemble a documentation test package. This will detail the results of each test process.

During the initial sweep and balance procedure all corroded connectors, amplifiers performing below manufacturers specifications, corroded amplifier brackets, corroded passives and damaged cables, and any equipment or part of the system that is in disrepair or is improperly placed will be repaired or replaced.

Baseband Video Testing at the Headend

The baseband video equipment, including the modulators, demodulators and video router, are tested with a VITS tester to insure compliance with manufactures specifications. All tests are recorded to become part of the overall system documentation.

End to End Testing

All standards in this document are based upon the testing of each individual leg of the system and the standalone testing of active components, such as modulators and demodulators. Within thirty (30) days after the completion of construction of the upgrade, a final end to end test will be performed after all components have been assembled and found to be operational. This test will take place using a VITS tester from up to ten locations within the system. The locations for this final end to end testing will be selected by the City. The results of this testing will be recorded and referenced as the "typical" end to end performance for VITS testing for the INET. The Company will use a VITS tester to establish standards reflecting those parameters listed in the NTC-7 specification. This will form the baseline for future testing.

All printout from this testing process will be entered into the overall system documentation package.

Connecting Link Data Oriented Testing

The following special tests will apply to the Connecting Links between the City Hall Annex to the Headend:

- The Company shall conduct a technical performance test in the City's presence to demonstrate continuity on the optical route from the point of origin to termination and compliance with the cable manufacturer's fiber optic link loss specifications.
- On the data portion of the Connecting Links between the City Hall Annex to the Headend, the Company will demonstrate that transmissions will encounter fewer than ten to the minus eighth (10^{-8}) unfiltered errors.

In addition, as part of the acceptance testing, the Company will demonstrate that the combined networks used to transmit and receive signals are operating and meeting the standards for the Institutional Network from the user perspective, regardless of the demarcation point. If the testing shows that there is a problem with the internal wiring or equipment for a location that is not the Company's responsibility, the City and the location will be so notified.

Confirmation by City

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City confirmation of the Institutional Network upgrade shall be based on:

1. documentation developed pursuant to this Section C (Acceptance Testing).
2. the reliability of the network after completion of the upgrade
3. physical inspection, if the City chooses to perform a physical inspection

Confirmation that the Company has satisfied the first test will be provided within 60 days after receipt of all documentation related to the Acceptance Testing set forth herein. Confirmation with respect to the reliability and physical inspection shall be provided within six months, so long as Company cooperates in any physical inspection and promptly provides proof of reliability on request. Confirmation of completion shall not be unreasonably withheld.

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Saint Paul Preliminary Construction Schedule

Startup Phase Activity	Month 1 Activity
Within 15 days after the INET effective ordinance, commence initial application for permits and site authorization Completion of permits and site authorization will constitute commencement of monthly construction schedule set forth herein	Const. 3 OTN's in Phase 1 Activity and Test all Fiber Equip. in Phase 1 Activate P.S. in Phase 1 Resplice Amplifiers in Phase 1 Rough Balance System in Phase 1 Start Const. of 3 OTN Locations in Phase 2 Const. Necessary Coax Run From H. E. Percentage of System Complete 14% Phase Locations: Phase 1 - Southwest Phase 2 - South, Southeast Phase 3 - North Phase 4 - Northwest Phase 5 - Downtown Phase 6 - Northeast

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Month 2 Activity	Month 3 Activity
Complete OTN Const. in Phase 2 Activity and Test all Fiber Equip. in Phase 2 Activate P.S. in Phase 2 Resplice Amplifiers in Phase 2 Rough Balance System in Phase 2 Start Const. of 2 OTN Locations in Phase 3 Const. Additional Fiber to Node # 9	Complete OTN Const. in Phase 3 Activity and Test all Fiber Equip. in Phase 3 Activate P.S. in Phase 3 Resplice Amplifiers in Phase 3 Rough Balance System in Phase 3 Start Const. of 3 OTN Locations in Phase 4
Percentage of System Complete 36%	Percentage of System Complete 49%
	Phase Locations: Phase 1 - Southwest Phase 2 - South, Southeast Phase 3 - North Phase 4 - Northwest Phase 5 - Downtown Phase 6 - Northeast

Month 4 Activity	Month 5 Activity
Complete OTN Const. in Phase 4 Activity and Test all Fiber Equip. in Phase 4 Activate P.S. in Phase 4 Resplice Amplifiers in Phase4 Start Rough Balance System in Phase 4 Start Const. of 1 OTN Locations in Phase 5 Complete OTN Const. in Phase 5 Activity and Test all Fiber Equip. in Phase 5	Complete Rough Balance System in Phase 4 Start Const. of 1 OTN Locations in Phase 6 Complete OTN Const. in Phase 6 Activity and Test all Fiber Equip. in Phase 6 Activate P.S. in Phase 5 Resplice Amplifiers in Phase 5 Rough Balance System in Phase 5 Start Rough Balance System in Phase 6 Start System Acceptance Testing in Phase 1 Start System Acceptance Testing in Phase 5
Percentage of System Complete 65%	Percentage of System Complete 80%
	Phase Locations: Phase 1 - Southwest Phase 2 - South, Southeast Phase 3 - North Phase 4 - Northwest Phase 5 - Downtown Phase 6 - Northeast

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Month 6 Activity
Complete Rough Balance System in Phase 6 Complete System Acceptance Testing In All Phase's Percentage of System Complete 100%